The Effect of Varied Surface Gravity on the Gravitational Radiation (Luminosity) Produced by a Binary System of Black Holes

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The purpose of this experiment was to determine whether surface gravity affects the luminosity of the gravitational waves produced by a binary system of Black Holes. It was hypothesized that an increase in surface gravity would minimize the gravitational waves, as the particles emitted by hawking radiation would reduce the mass of the black hole, in turn, reducing the luminosity of the gravitational waves. This experiment was run using Finesse 2.0 software, and appropriate parameters for surface gravity were set up along with a two black holes surrounded by space debris and satellites. The average luminosity of the gravitational waves was graphed, and the graph depicted that high surface gravity maximized the luminosity, rejecting the hypothesis. As the surface gravity of the system increased, the orbital velocity of the system increased as well. The black holes orbited faster and faster, which increased the luminosity of the gravitational waves that were emitted by the system. The limitations of this experiment include that the software was not flexible and could not efficiently simulate a binary system, also it was not 3-D, and it was hard to gauge the effects of the surrounding particles from the gravitational waves. For future experimentation, a different software could be used to analyze the effects of gravitational waves on surrounding objects.

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